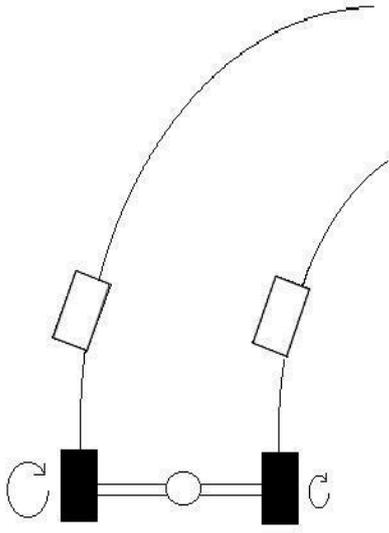


2WD vs 4WD Safety

The argument for selection of 2WD vs 4WD, has gone on for some time with manufacturers and drivers alike. There are many facets to the argument namely cornering, braking and general surface traction.

Cornering

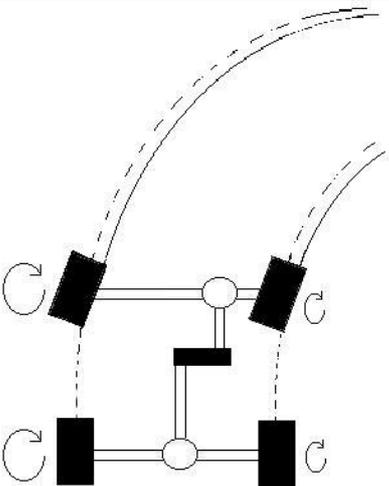


The 2WD is most likely to break away, although it is also the easiest to recover.

In a corner, acceleration will direct pressure (weight) to the back of the vehicle relatively evenly. This allows the steering to control and correct. In a 2WD (rear wheel drive) the rear axle will break away from the vehicle's line of travel relatively easier and much earlier than the same vehicle in 4WD on the same corner. Once the vehicle breaks away, it is a matter of holding the accelerator steady and steering towards the slide to bring the vehicle under control. However, the ability to first recognise this break away and then to react is the core skill.

In 4WD in the same vehicle, the rear wheel pressure will be the same as in 2WD, however front wheel traction is increased significantly due to the front axle driving ideally at the same speed as the vehicle's speed. The centrifugal forces still act on the 4 wheels however. As with any vehicle when cornering the outside wheels will tend to travel a greater distance. In a 4WD the front and rear axle are forced to turn at equal speed, when

a set of wheels turn faster or slower than the vehicle's speed traction is lost, causing the vehicle to loose control.



This is known as under-steer or a four-wheel slide. The reason for this lies within the dynamics of how a 4WD works. In the event of a four-wheel slide, it is extremely difficult to retrieve the vehicle.

Essentially the vehicle in 4WD will hold for longer in a corner than the same vehicle in 2WD, however when it loses traction the 4WD is much more difficult to recover than the equivalent 2WD.

Manufacturers are leaning towards AWD (all wheel drive) vehicles for better control. Unlike the 4WD, when an AWD corners it can corner with greater traction than a 4WD because each of the 4 wheels can drive at a different speed. With each wheel driving at a different speed the vehicle is less likely to loose traction.

Essentially if you have access to an AWD setting in your vehicle select this over 4WD for safer handling.

Reasoning:

4WD vehicles are heavy, high centre of gravity and axle weight unbalanced.

When the vehicle is in 4WD High, both axles are driven at the same speed due to the transfer case locks up.

2WD vs 4WD Safety

When a vehicle wheels loses traction the ability to straighten up is determined by The drivers ability Surface of the road the vehicle will travel over during the following event

- The tyre tread
- The tyre pressure
- The mechanical condition of the suspension and the steering
- The stability of the load

To correct a rear wheel drive (2WD) vehicle in a corner the acceleration must be increased or maintained (on gravel/wet surfaces) or decrease (on corrugations).

When a vehicle, which is in 4WD, is in the same situation as above (on a right-hand corner), the rear cannot be driven separate to the front. Traction is lost as the front of the vehicle moves to the right (slowing down) as the rear of the vehicle speeds up by moving to the left of the pivot point. Both axles loose traction since both axles are driven or held at same speed by the drive shafts being locked. Acceleration may spin the front and the rear since traction has been lost, and lost traction means “no ability to steer or stop”, hence a four-wheel slide result.

Retrieval will require more good luck than skill since the driver will not have much feel for what is happening.

Braking

When braking in a rear wheel drive (2WD) vehicle, the weight is transferred from the rear to the front axle due to the deceleration. The front wheels are not being driven from the engine, and consequently one wheel can lock independent of another causing the vehicle to take longer to stop with less control.

The same vehicle in 4WD when braked will have the equal amount of weight transferred to the front axle (as in 2WD). However, as the front axle is being driven by the engine when braking (only if the driver brakes in gear), the vehicle will pull up quicker with more control.

Essentially while an axle is getting drive it is less likely to lock the wheels under brake, resulting in greater control under brakes independent of the driver's skill.

General Surface Traction

2WD vehicles are greater for hard surfaces with good grip at speed, almost on par with an AWD. The same surface when it is slippery the AWD has better traction and handling hands down as it allows for each wheel to travel at a different speed.

On slippery surfaces 4WD is the safest option at *low speed*. The moment speed becomes a factor, an AWD is the better and safer option.

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For further information

enquiry@australian4wd.com.au

www.australian4wd.com.au